Measuring successful knowledge sharing among academia through social media

Saadiah Ghazali, Nor Intan Saniah Sulaiman, Nerda Zura Zabidi, Mohd Faizal Omar, and Rose Alinda Alias

Citation: AIP Conference Proceedings **1691**, 030006 (2015); doi: 10.1063/1.4937025

View online: http://dx.doi.org/10.1063/1.4937025

View Table of Contents: http://scitation.aip.org/content/aip/proceeding/aipcp/1691?ver=pdfcov

Published by the AIP Publishing

Measuring Successful Knowledge Sharing Among Academia through Social Media

Saadiah Ghazali[1, a)], Nor Intan Saniah Sulaiman[2, b)], Nerda Zura Zabidi[3, c)], Mohd Faizal Omar[4, d)] and Rose Alinda Alias[5, e)]

[1,2,3,4]*School of Quantitative Sciences, UUM College of Arts and Sciences, UUM Sintok, Kedah, Malaysia*
[5]*Faculty of Computing, UTM Skudai, Malaysia*

[a)]Corresponding author: saadiahsaadiah@gmail.com
[b)]norintan@uum.edu.my
[c)]nerda@uum.edu.my
[d)]faizal_omar@uum.edu.my
[e)] alinda@utm.edu.my

Abstract. This paper aims to study the influence of social media on knowledge sharing among academia. Previously, many researches have been done to explore the importance emergence of social media for public use, but there are still limited studies on how this technological advancement affects the academia. For this study, Facebook is chosen as one of the online social networking tools as the medium of knowledge sharing. To begin with, this study is started with the identification of factors that encourage the academia to share their knowledge through social media. These factors are then categorized based on Theory of Planned Behavior (TPB). After this knowledge has successfully shared, the level of successful knowledge sharing through Facebook is modeled using Fuzzy Logic. Fuzzy inputs for this study are the number of like, comment and share. Findings from this study indeed showed that there are many reasons encouraging academia to utilize social media for their work. Besides, this paper contributes new knowledge to fuzzy logic application as it is the first known research in measuring Facebook engagement for knowledge sharing purposes. In conclusion although there exist some barriers and limitations with the use of social media, academia are showing a positive shift in the application of these tools for work.

INTRODUCTION

Nowadays knowledge is easily shared with the help of social media. The utilization of social media such as wikis and social networking sites has expanded exponentially, where this advancement are ceaselessly turning out to be more coordinated into our daily lives [1]. The choice to share knowledge via social media can be recognized as a voluntarily behavior. People want to perform that behavior and it does not come from an external forces. This behavior is governed by the factors that encourage the implementation of this behavior. Apart from that, development of social media affects all job professions including academia and scholars. Scholars specifically are progressively embracing and adjusting these tools for utilization in their research work [2]. Despite that, there are limited studies done to explore how academia make used of social media and even fewer focused on Malaysian academia. Most of previous researches in Malaysia focused on the importance of social media to students [3] [4]. The focus attention of this research is to study the factors that support the behavior to share knowledge through social media among academia and once this knowledge has successfully shared, how can it be measured. For this

Innovation and Analytics Conference and Exhibition (IACE 2015)
AIP Conf. Proc. 1691, 030006-1–030006-6; doi: 10.1063/1.4937025

study, Facebook is chosen as one of the social media tools to measure the successful knowledge sharing through it. This is due to the fact that this social networking site has proven famous among the academia in which Facebook encourage various exchanges of knowledge and help in nurturing socialization among them [5]. To measure the successful of knowledge sharing, Fuzzy Logic is applied because its ability to solve uncertainty dealing with vague impression and crisp value. Measurement level of successful knowledge sharing through Facebook is developed to evaluate the implementation of the behavior to share knowledge. In addition, we are motivated in conducting this study because we want to solve the uncertainty findings from previous research. Result from their research indicates that the pattern of knowledge shared analyzed from the Facebook's posts is made intuitively [6].

Knowledge Sharing Through Social Media

There are many methods used to share knowledge such as face-to face meetings, discussion in groups or using application through social media. Social media can be characterized as a group of Internet-based applications that based on the ideological and innovative establishments of Web 2.0 [7].Web 2.0 is the extension of Web 1.0 where it emphasize on its main feature of allowing the formulation and exchange of user-generated content. There are various applications of social media such as blogs, forums and social networking sites. Through social media, people are connected anytime and at anywhere where they talk and discuss on certain topic of interest. Ref [8] said that, knowledge sharing needs collaboration and contribution of individuals in a group and if people in the group have common interest, then the communication will be effective. By means of social media, individual get to seek an explanation of current issues, finding inspiration for future projects and learning the impact of past tragedy. Furthermore, there are many researches that have been done to study the influence of social media towards knowledge sharing in specific organizations. For example, research by [9] emphasized on the creation of a specific network that could enhance the way information is shared via online knowledge management systems (KMS) in healthcare industry. Besides that research done in Nielson, a global marketing and advertising research company tried to understand how these technologies help the company to assist a knowledge sharing culture [10].

Social Media Application By Academia

Academia are among the professions that incorporate social media in their work. Facebook, Twitter, Academia.edu, Linkedin, Google Docs, SildeShare and Skype are some example of tools used by academia that help them in their research work [11]. There are many benefits that academia gain through the utilization of social media. The most cited reason on why academia engage social media is its capability to encourage cooperation and its communication flexibility among peers [2][11]. In addition, this communication is connected internationally and across different area of expertise. Besides that, social media additionally give space to casual discussions, help to reinforce existing relationship, and shape new ones with academia of much alike interest [12]. With this special connection, academia can refer to each other for any problems in their field of work and also seek advice for personal records. Ref [11] said that, getting an up to date information regarding current research is one of the advantages of social media to their scholarly work.

Facebook Used in Academic Setting

Facebook is one example of social networking sites available with the emerging of Web 2.0. Social networking sites can be defined as an online service that allows its user to create a public profile where this profile is view by other users made through invitation by the administrator. Currently, the number of active Facebook users is 1.32 billion users with 30% of them only using it from their mobile phone [13]. This statistic increased by 14% when compared with the previous year. This finding proved that, each day there are new individual registered as Facebook users. People connected through Facebook to reach an extensive variety of objectives such as making new friends, rebuild current friendship, finding inspiration in the case of losing an occupation [14] and even grieving for loved ones [15]. However, nowadays the application of Facebook is not restricted only for entertainment or personal pleasure. In Malaysia, numerous researches are done to study the emerging of this site towards the educational environments. Ref [16] said that, Facebook helped in enhancing the learner's self-esteem, reduces anxiety and improve in writing and reading skills. Besides, Facebook's potential as an educational tool should be directed to scholarly research and practices as recommended by the author. Apart from that, research done on Informatics and non-informatics undergraduate programs in Malaysia found that many students and educators have begun to explore

the utilization of Facebook as a tool for communicating with their peers and Institution as well as for teaching purposes [4]. Another research conducted in Universiti Teknologi Mara undergraduate and postgraduate students concluded that the social networking sites indeed provide a positive impact in their performance as it create the platform for communication between students-supervisors and chatting with friends for educational interest [3]. Therefore, we can see from the above citations that the previous researches are more focused on the impact of social media towards students rather than the academia. Thus, this paper aims to fill this gap by discovering the application of social media by Malaysian academia specifically Facebook. In addition, this paper also suggested the measurement model use to evaluate the successful knowledge sharing through Facebook where this model is developed based on the understanding of Fuzzy Logic.

METHODOLOGY

This section provides the methodology utilized in this research works. To begin with this paper applied both qualitative and quantitative approach. For the qualitative approach, the methods used include literature review analysis and semi-structured interview. Firstly for the qualitative approach, literature review analysis is done to discover the initial factors that encourage academia to share knowledge through social media. The review is based on previous research that likewise same with this study. Secondly, interview will be done to get an extra factors from the academia themselves and to explore in more detail how they use social media for their work. The interviews are yet to be done as this research is still in progress. A total of five respondents for this interview will be selected among the Malaysian lecturers. The interview questions are still in the constructed phase where it is modified from previous researches [11][17]. The interview questions will be focused on how academia make a use of social media tools and what are the additional factors contribute to this behavior. Then, these factors will be categorized using Theory of Planned Behavior (TPB). This theory served as the theoretical framework for this study.TPB is perhaps the most convincing and a popular social psychological model for clarifying and predicting human behavior in particular connections [18]. We used this theory to study what makes the academia engage in the behavior to share their knowledge publicly through social media based on the factors acquire. According to TPB, this behavior is guided by the behavioral intention where this behavioral intention comprised of six components that collectively represent a person's actual control over the behavior.

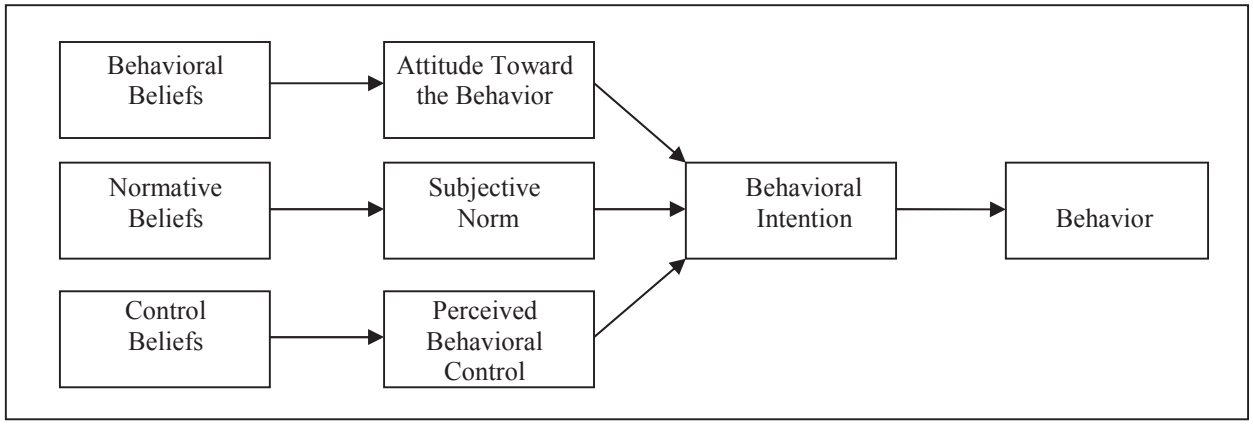

FIGURE 1. Components of the Theory of Planned Behaviour (TPB)

The adopted Model of the Theory of Planned Behaviour (TPB) (Azjen, 1991)

Next, we proceed with the quantitative approach. The method used to collect data in this approach is content analysis. After the academia has successfully engaged in the behavior i.e. sharing knowledge through social media, we want to assess the measurement level of this successful knowledge sharing through social media. To perform that, firstly we recognized several Facebook page administered by academia in purpose of knowledge sharing. Then, using a fishbowl technique the selected Facebook page is made randomly. This technique is done by randomly drawing cards from a box. These cards are firstly written with their respective name of Facebook page. Content analysis is done through this Facebook page in which it analyzed the collection of the academician's post from Mac

to June 2015. We characterized the posts according to its date, post content and it respective like, comment and share. The post contents are divided to four topics and the entry is recorded for each months. Excel is used in analyzing all the acquired data. Then, to construct the measurement level of successful knowledge sharing Fuzzy logic is used. Fuzzy logic is an extension of logic uniquely intended for representing knowledge and human thinking in such a way, that it is manageable to operate by a computer. The term fuzzy logic was introduced in the 1965 proposal of fuzzy set theory [19]. Fuzzy logic systems are knowledge-based or rule-based ones developed from human knowledge as fuzzy IF-THEN rules. This paper applied the Mamdani type of fuzzy logic inference system [20]. There are four main parts in this system. The first part is fuzzification where crisp set of input variables are converted to the fuzzy set variables. Then linguistic variables are defined for each input variable followed by defining of linguistic terms that correspond to the values of the linguistic variables. Lastly, membership functions are constructed to quantify the linguistic terms. In the rule base part, the rules of the fuzzy inference system are formulated. In this paper, our rule base is constructed based on literature survey that is supported by an expert opinion. Third part which is the inference engine part is where the fuzzy logic system maps the fuzzy input values to fuzzy output values using a set of IF-THEN rules (given in the rule base). Finally, defuzzification step is done by performing this fuzzy to non-fuzzy mapping which is obtained by the triangular membership functions. The summary of fuzzy logic system is shown in Figure 2.

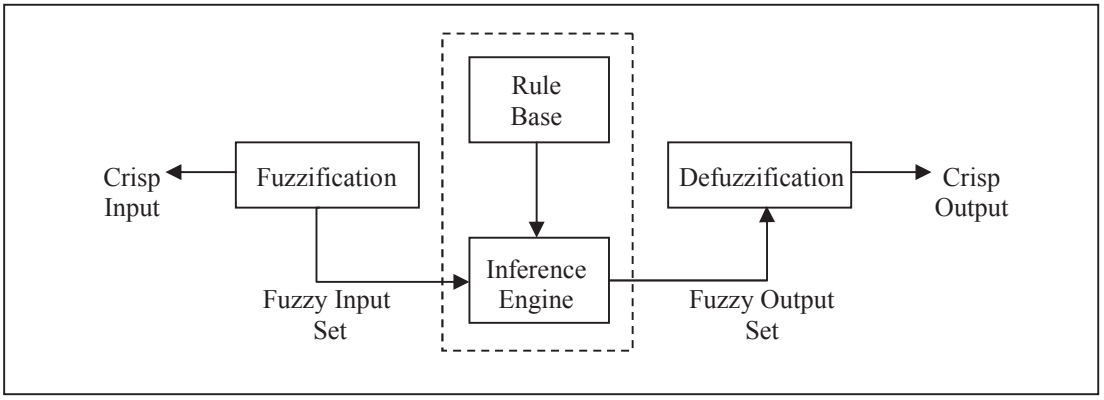

FIGURE 2. Mamdani type of Fuzzy Logic System (Mamdani, 1974)

INITIAL FINDINGS AND CONCLUSION

In this paper, the discussion is brief on the initial findings from quantitative approach only that is referred to the measurement model of successful knowledge sharing. The first step in Fuzzy Logic system is the identification of the fuzzy input. To come out with the fuzzy inputs, we explored the Facebook application and agreed that the corresponding value of like, comment and share determine the feedback of the knowledge shared. This feedback is what we analyzed to construct the measurement model based on fuzzy logic. Therefore, Facebook value of like, comment and share are the fuzzy inputs used in the system. These values are considered as crisp because there is no specific level determining their level of low or high. This are the reason why we chose fuzzy logic as it is suitable in dealing with knowledge representation and it provides robust solution for multi-input systems. Table 1 showed the fuzzy inputs for this study with their respective linguistic variable and interval. The interval is resulted from the content analysis done for the Facebook page.

TABLE 1. Fuzzy set of inputs variable

	Low	**Average**	**High**
Like	(0, 0, 70)	(0, 70, 140)	(70, 140, >210)
Comment	(0, 0, 7)	(0, 7, 14)	(7, 14, >21)
Share	(0, 0, 15)	(0, 15, 30)	(15, 30, >45)

For this paper, triangular membership function is applied due to their computational efficiency and simplicity in their formulation. The expected fuzzy outputs for this study is to see the performance of the knowledge shared

whether is it lowly successful knowledge sharing, moderately successful knowledge sharing or highly successful knowledge sharing. Table 2 showed the fuzzy outputs for this study.

TABLE 2. Fuzzy set of output variable

Linguistic Variable	Interval
Lowly Successful	(0, 0, 0.2)
Moderately Successful	(0, 0.2, 0.6)
Highly Successful	(0.2, 0.6, >1)

The rules are developed based on the literature survey and supported by the expert opinion. These rules are in the form of IF-THEN rules. The rules are as follow:

1. If like is high and comment is low then moderately successful KS
2. If like is high and comment is average then highly successful KS
3. If like is high and comment is high then highly successful KS
4. If like is high and share is low then moderately successful KS
5. If like is high and share is average then highly successful KS
6. If like is high and share is high then highly successful KS
7. If like is average and comment is low then lowly successful KS
8. If like is average and comment is average then moderately successful KS
9. If like is average and comment is high then highly successful KS
10. If like is average and share is low then lowly successful KS
11. If like is average and share is average then moderately successful KS
12. If like is average and share is high then highly successful KS
13. If like is low and comment is low then lowly successful KS
14. If like is low and comment is average then lowly successful KS
15. If like is low and comment is high then moderately successful KS
16. If like is low and share is low then lowly successful KS
17. If like is low and share is average then lowly successful KS
18. If like is low and share is high then moderately successful KS

The contribution of this study includes providing Malaysian academia a comprehension on the significance of utilizing social media as knowledge sharing devices. Not just that, this paper can give a view to the marketers to turn out with more intelligent and innovative applications that cater academia needs to engage in social media. Furthermore, this study also contributes to new application of fuzzy logic system as it is the first study done in analyzing Facebook engagement. As been cited in the introduction section before, fuzzy logic approach is selected because of its ability to deal with uncertainty. Uncertainty exists in this study because different individuals have different opinion on the level of low or high in the number of like, comment and share in Facebook post. Thus, findings from this study can complement previous study that is made using intuitive approach in discovering level of knowledge sharing through social media. Next, this study will be extended with the literature review analysis and semi-structured interview to explore the factors that encourage knowledge sharing among academia.

As a conclusion, this study aimed to explore the usage of social media on knowledge sharing and how it affected the Malaysian academia. Besides that, the main objective for this study is to propose a new measurement model of successful knowledge sharing through social media. This model not only introduced a new method to measure the Facebook engagement but it also provide an overview for more extensive research regarding knowledge management. Last but not least, academia who regularly shares knowledge by posting through Facebook can analyze the feedback and popularity of their post.

.

ACKNOWLEDGMENTS

We would like to extend our gratitude to Malaysia Ministry of Education for providing funding under the Research Acculturation Collaborative Effort (RACE) Funds, Ministry of Education (No. 600-RMI/RACE 16/6/2(2/2013)).

REFERENCES

1. K. Zickuhr, Pew Internet & American Life Project, (2010), available at http://pewinternet.org/Reports/2010/Generations-2010.aspx
2. E. Collins and B. Hide, "Use and relevance of web 2.0 resources for researchers," In Publishing in the Networked World: Transforming the Nature of Communication 14th International Conference on Electronic Publishing, pp. 271-289 (2010).
3. Adam Mahamat Helou and Nor Zairah Ab.Rahim, International Journal of Electronic Commerce Studies **5**(2), 247-254 (2014).
4. J. See Yin Lim, S. Agostinho, B. Harper and J. Chicharo, Journal of Information, Communication and Ethics in Society **12**(3), 177-194 (2014).
5. S. H. Ryan, M. J. Magro and J. K. Sharp, Journal of Information Technology Education **10**, 1–16 (2011).
6. N. I. S. Sulaiman, R. A. Alias, M. F. Omar, N. Z. Zabidi and R. Zakaria, "Promoting the experts through social media as new culture among academia: An initial study," in Proceedings of the Asia Pacific Conference on Educational Management and Leadership (APCEMaL 2014) (Johor Bahru, JB, 2014).
7. M. Kaplan Andreas and M. Haenlein, Business Horizons **53**(1), 61-70 (2010).
8. W. P. Mtega, F. Dulle, and R. Benard, Knowledge Management & E-Learning **5**(2), 205–217 (2013).
9. E. A. Cudney, S. M. Corns and S. K. Long, International Journal of Collaborative Enterprise **4**(1-2), 17-33 (2014).
10. D. Adamovic, A. Potgiete and M. Mearns, South African Journal of Information Management **14**(1), 1-7 (2012).
11. A. Gruzd, K. Staves and A. Wilk, Computers in Human Behavior **28**(6), 2340-2350 (2012).
12. A. Gruzd, B. Wellman, and Y. Takhteyev, American Behavioral Scientist, Special issue on Imagined Communities **55**(10), 1294-1318 (2011).
13. M. Prigg, Facebook now has 1.32 billion users (2014), available at http://www.dailymail.co.uk/sciencetech/article-2703440/Theres-no-escape-Facebook-set-record-stock-high-results-beats-expectations-1-32-BILLION-users-30-mobile.html#ixzz3esSNI1so
14. M. Burke, R. Kraut, and C. Marlow, "Using Facebook after Losing a Job: Differential Benefits of Strong and Weak Ties," in Proceeding of ACM CSCW 2013: Conference on Computer-Supported Cooperative Work.1419-1430, (2013).
15. A. Marwick and N. Ellison, Journal of Broadcasting and Electronic Media **56**, 378-400 (2012).
16. S. Aydin, Educational Technology research and development **60**(6), 1093-1106 (2012).
17. H. Jerome, "A case study examining how students make meaning out of using Facebook as a virtual learning community at a Midwestern university," Unpublished PhD thesis, Iowa State University, 2013.
18. I. Ajzen, The theory of planned behavior. Organizational behavior and human decision (1991).
19. L. A. Zadeh, Information and control **8**(3), 338-353 (1965).
20. E. H. Mamdani, S. Assilian, "Application of fuzzy algorithms for control of simple dynamic plant," in Proceedings of the Institute of Electrical Engineers **121**, 1585–1588 (1974).